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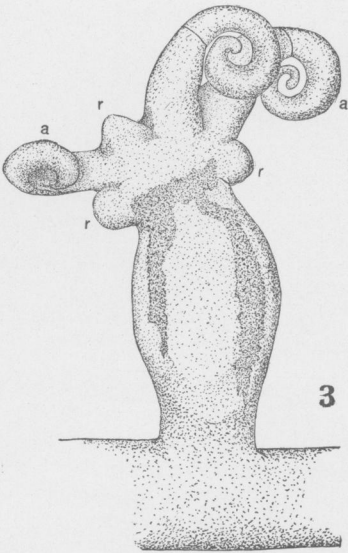
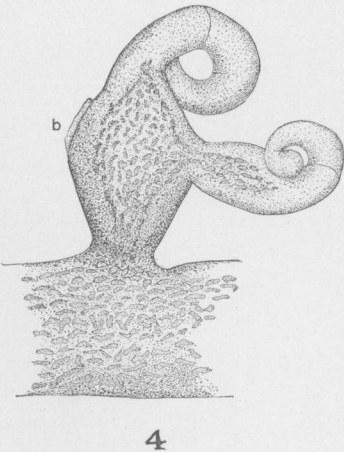
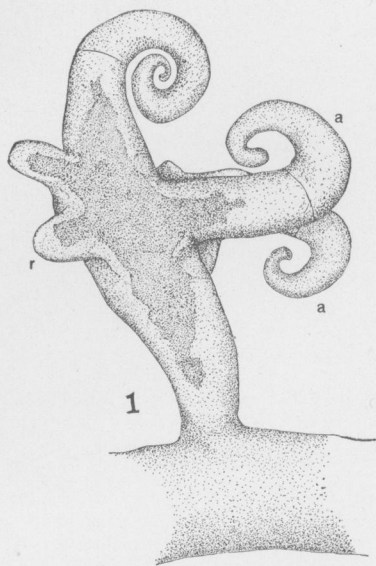
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NICHOLS on VAUCHERIA.

BRIEFER ARTICLES.

Abnormal fruiting of *Vaucheria*. (WITH PLATE XXI.)—In specimens of *Vaucheria geminata*, var. *racemosa*, brought into the laboratory in October, 1894, some interesting cases of abnormal fruiting organs were observed. The material was collected in the grassy flats of Cayuga lake, at a spot covered by the overflow of a small stream.

The variations from the normal were frequent, and included three general types:

1. Those in which the oogonia were aborted, leaving on the fruiting branch stump-like protuberances.
2. Those in which the oogonia were prolonged into vegetative filaments.
3. Those bearing fully developed antheridia in places normally occupied by oogonia.

Numerous combinations of these types with different intermediate forms were also present.

The first case is inconspicuous, and admits of some doubt, inasmuch as the stumpy protuberances closely resemble branches from which oogonia have fallen. In certain specimens, however, the peculiar shape of the end of the stump, its unusual length, and the entire absence of any trace of a broken sheath, such as is usually left by a fallen oogonium, furnish conclusive evidence that the female organ has not been present. Whether the rudiment represents an oogonium or an adventitious antheridium, such as is described in type three, it is impossible to determine.

The second type shows close analogy to conditions found in different fungi, notably the Saprolegniaceæ. The vegetative filaments arise sometimes from the apex of an oogonium, sometimes directly from the pedicel, thus replacing the oogonium. They are usually narrower than the mother filament, but in cases which seem to be intermediate between this and the first type, the young filaments have a diameter equal to that of the pedicel from which they arise. Different forms of this type are described and figured by Campbell in the *American Naturalist* for June, 1886, from observations made on artificial cultures.

The third case presents a somewhat more remarkable condition, but one to which a partial analogy may be found in ferns, where rudimentary prothallia, from crowding or insufficient nutriment, produce only antheridia. Reasoning from this analogy, we are led to assume that the filaments of *Vaucheria* upon which such fruiting organs are

produced must have grown under starved conditions, or, for some other reason, have not exercised a normal vegetative function. In the appearance of the plants we find nothing either to confirm or deny this assumption. In some cases, it is true, the filaments bearing such organs were more or less disorganized, the chlorophyll scanty and aggregated in broken masses. In other filaments, however, upon which the fruiting branches were equally deformed, the chlorophyll was in a healthy condition, and the filaments had every appearance of thrift and vigor. Moreover, on filaments wholly destitute of chlorophyll and partially disorganized, perfectly normal fruit bodies appeared. But these appearances become totally irrelevant to our conclusions when we remember that the non-septate structure of these plants permits free circulation from filament to filament through long distances, and hence the chlorophyll conditions may become conspicuously altered, in a certain part of the plant, after the development of the fruit branch.

In order, then, to prove the relation of growth conditions to this abnormal development, it remains to be shown, first, what were the conditions of growth under which this occurred; second, that similar conditions will produce similar results; and, third, that opposed conditions tend to prevent such development. As to the first we know only that the plants grew floating in the water of a flooded marsh, not in contact with the soil, and bathed, presumably, by comparatively clear water, since they floated above a toughly sodded bed. We also know, from experiments, that these same plants grown in vessels of clear water in the laboratory, continued to produce abnormal fruit. No experiments have been made to prove that normal plants would degenerate if grown in the same way.

As to whether the same material grown on moist earth or in less crowded masses would behave differently, we have no definite experimental knowledge, and hence, on the whole, are not warranted in asserting conclusively the relation of this peculiar development to growth conditions.—MARY A. NICHOLS, *Cornell University*.

EXPLANATION OF PLATE XXI.—Fig. 1 shows a mixed type, *r*, *r*, being rudimentary organs either male or female, described under type 1, and *a*, *a*, antheridia developed in place of oogonia (type 3).

Fig 2 illustrates another form of types 1 and 3. *r*, rudiment; *a*, *a*, antheridia.

Fig. 3 shows type 3 bearing three antheridia, and no oogonia, or perhaps very rudimentary ones, at *r*, *r*, *r*.

Fig. 4 shows parent branch and lateral bud, each bearing one antheridium only; *b*, a broken branch, leaving no indication of its nature.

NOTE.—Such cases as that shown in Fig. 1 leave room for suspicion that the branches *a*, *a*, are not simple antheridia, but lateral buds similar to that of

Fig. 4, upon which no oogonia have developed. Cases like that shown in Fig. 3, however, and another case observed (of which, unfortunately, no camera-lucida sketch could be secured), which bore a whorl of six antheridia, exactly corresponding in position to the normal oogonia, belong certainly to type 3, as given.

Astragalus Blakei n. sp.—*A. Robbinsii borealis* n. var. in MS. and herbarium, 1894.

A. Robbinsii Gray's Man., 2nd ed. (1856.)

A. alpinus L. Gray's Man., 3rd ed. (1862.)

Perennial, few to many stemmed, from a fibrous knotty root deeply fixed in the cliffs.

Stems 3–5^{dm} high, erect, sometimes slightly decumbent at base, sparsely pubescent, slightly angular, twisted, striate.

Stipules erect, upper ones becoming deflexed, triangular ovate, acute or obtuse, 4–6^{mm} long; leaves 3–10^{cm} in length, with from 5–8, generally 6–7, pairs of leaflets; leaflets opposite or nearly so, on petioles about 2^{mm} long, oblong, elliptical, the middle ones larger and the upper ones generally decreasing in size faster than the lower, obtuse and frequently emarginate, green and glabrous above, mealy pubescent beneath, with white appressed hairs, becoming more glabrous with age.

Peduncles one or two, 10–25^{cm} in length, very erect, twisted striate, nigrescently pubescent.

Raceme ovate, becoming oblong and loose, 5–15 flowered.

Flowers about 8^{mm} long, pedicels often equalling or exceeding the length of the calyx.

Bracts linear, acute about half as long as the pedicels, calyx tubular campanulate, nigrescently hairy, the linear bluntish teeth more hairy and one-third the length of the calyx. Corolla strongly resembling that of *A. Robbinsii*, light violet or sometimes white with the keel tinged with violet or purple. Legume 8–25^{mm} in length, horizontal, triangular-turgid, oblong and obtuse or acute at both ends.

Stipe shorter than calyx, thickly pubescent with whitish or nigrescent hairs slightly transparent, tipped with the recurved persistent style, both sutures curved, dorsally sulcate, often but slightly so, 4–8-seeded.

Type stations: Willoughby Mt., Smuggler's and Nebraska Notches, Vt., Willoughby Mt., Westmore, Vt. Rev. Joseph Blake (previous to 1856), etc. Smuggler's Notch, Mt. Mansfield, Stowe, Vt., C. G. Pringle, etc., Nebraska Notch, Mt. Mansfield, Underhill, Vt., C. G. Pringle and F. H. Horsford. Fort Kent, St. John River, Maine, Miss Kate Furbish.

Specimens of the Rev. S. R. Butler from Forbeau, Labrador, of J. Macoun from the western mountains, and of W. H. Dall from Alaska appear to be of this species.—W. W. EGGLESTON, Rutland, Vt.